

# Rookery Bay National Estuarine Research Reserve

Introductory Power Point presentation script

## Slide 1

Welcome to Rookery Bay!

- Introduction to subjects covered in presentation

## Slide 2

Rookery Bay N.E.R.R.

- What is an N.E.R.R.? National Estuarine Research Reserve. System set up in 1972. Established for long-term research, environmental monitoring, education and coastal stewardship. 26 NERRs nationwide, including 3 in FL. The reserves manage more than 1 million acres of coastal habitats. Why do we need so many NERRs? Estuaries have different characteristics/habitats depending where they are located. Our estuaries in SW FL are very different than those in Alaska, but all play important and similar roles
- Rookery Bay NERR established in 1978. Currently manage approx 110,000 acres. NOAA (National Oceanic and Atmospheric Administration) is federal partner agency. State partner agency is Florida Department of Environmental Protection. Approx 1/3 funding from NOAA, remainder from DEP and grants.

## Slide 3

Rookery Bay borders

- Currently manage approx 110,000 acres. Borders run from Gordon Pass, northern end of Key Island (Keywayden), south around the back side of Marco Island through Cape Romano and the 10,000 islands to the northern border of Everglades National Park.
- Point out the actual bay called Rookery Bay. Indicate where the Learning Center is, where the old lab facility is, and where Henderson Creek (main fresh water source for Rookery Bay) is located.

## Slide 4

Rookery Bay Staff Activities

- Rookery Bay Staff divided into three fields:
- Resource Management: activities include (clockwise) manatee/marine mammal rescue (and monitoring), habitat restoration – removing non-native plants and replanting natives (will cover in more depth in later slides), using fire as a tool to maintain habitats – fire not always bad, some habitats dependant on fire to remain healthy, sea turtle nest monitoring

## Slide 5

RB Staff Activities

- Research: Shark and fish population monitoring, experiments to re-establish oyster beds, water quality monitoring (6 monitoring stations set up around reserve. Every half hour automatically record water temp, salinity, pH, turbidity, conductivity, dissolved oxygen. This is a federal requirement, something all NERRs do. Data goes to national database.) Crab monitoring – both looking for non-native species, and using native species as an indicator about the estuary's health. Many research activities are collecting data in advance of SGGE (Southern Golden Gate Estates) and Everglades restoration or for post-restoration comparisons.

## Slide 6

RB Staff Activities (counter-clockwise)

- Education: Boat based programs; trawling to learn about estuary inhabitants in a hands-on manner, programs for schools in our new learning center.

## Slide 7

What is a watershed? Important concept in understanding of estuaries and how to protect them.

- Upland region that drains into an adjacent body of water
- In order to protect an estuary, its watershed (source water) must also be protected.

## Slide 8

What is an estuary? Ask class for definition before clicking ahead

- A semi-enclosed body of water where fresh and salt water mix.
- Can come in many shapes and sizes. Can be where a river dumps into sea, a bay protected by barrier islands, etc.

## Slide 9

Why are estuaries important? Very important concept to get across!!

- Help buffer storm impacts and protect coastline
- Provide habitat and nursery for birds
- Provide habitat and nursery for commercially or sport important fish and shellfish (estimates range from 75-90% of commercially or sport important seafood “products” spend at least part of their life cycle in estuaries)
- Filter sediments and help remove pollutants
- Provide food (and \$) for humans
- Provide other economic benefits from recreation and real estate
- Modulate the release of fresh water – to protect marine habitats

Images on the slide:

- Small fish: top to bottom – sheepshead, 2 snook, redfish or red drum. All of these fish are young. The ruler at the bottom is only 6 inches long.
- Adult fish: full-grown snook 36” long. Large snook like this are all females and they produce much larger amounts of eggs than smaller female snook. These large females are protected, that is why there is an upper size limit for snook – because of their value as “egg factories” for the survival of the species.
- Bird picture: What is a Rookery? How did we get our name? A Rookery is an area where birds gather for nesting. We got our name because there is a bay in the reserve called Rookery Bay. Between 4,000-6,000 birds have been known to nest on two mangrove islands in the bay

## Slide 10

What are Mangroves? Three main types here in SW Fl. Grouped together based on similar characteristics rather than genetic similarity. Trees not closely related at all.

What makes a mangrove? Ability to grow in or near salt water, can also grow in fresh, but would likely be out-competed there. Live-bearing trees (seeds germinate on tree). Intolerant of cold – mangroves grow around the world in a band about 28 degrees north and south of equator. Mangroves not found in large numbers north of Tampa on west coast of Fl because of cold.

- Red Mangrove – can grow directly in salt water. “Excluder” – doesn’t allow much salt into plant tissues. Seedlings called propagules, look like long green beans, wash up on beaches. Called red because of reddish branches and roots that reach into water. Prop roots help support tree and provide shelter for small fish and invertebrates. Aerial roots drop from canopy and grow in the water. Nicknamed walking tree because it reaches and walks into water to expand and grow. The photo of the prop roots show how plants and animals grow on the roots which provides shelter for small fish and inverts. The things growing on the roots (like algae, etc) also provide food for the little critters that live in the shelter of the roots. Large predatory fish like snook and redfish often patrol along the edges of the mangroves looking for the little fish and inverts that use the roots for protection.

- Black Mangrove – distinguished by black bark, and the presence of “pneumatophores” (small, pencil like projections from the ground underneath the tree. These are actually part of the root system and help bring oxygen to the roots). Black mangroves don’t usually grow directly in the water like the red mangroves do, although they are often surrounded by stagnant water that can be hypersaline because of evaporation. Black mangroves excrete the excess salt through their leaves.
- White Mangroves- typically grows above the high tide line and inland of the other mangroves. Also excretes salt. Special glands at base of leaf once believed to expel salt. Their actual function is still under debate.

### Slide 11

Why are mangroves important?

- They provide important canopy (tops of trees) habitat for animals such as snails and crabs which are food for other animals.
- They provide important nesting and roosting sites for birds (rookeries)
- Very important habitat (food, water, shelter, room to grow) for a huge variety of fish and invertebrates
- Source of DETRITUS - detritus is the decaying plant material that forms the base of the estuarine food web. Leaves and branches fall into the water. The branches get broken down by bacteria and fungi, used as homes by crabs, worms, snails, etc. The leaves get broken down by bacteria and fungi, which serve as food for small shrimp and other crustaceans, which are food for small fish, which are food for bigger fish, which are food for sharks, dolphins, osprey, eagles, people, etc. Detritus is the fuel that runs the estuarine engine or food web.

### Slide 12

How have humans impacted estuaries?

- The vast majority of Florida’s population lives within 10 miles of the coast. That amount of development pressure had led to some drastic changes in our estuaries.
- We’ve affected the quantity of water making it into the estuaries. Some areas are getting too much fresh water (like Naples Bay) because of land draining efforts and canals. Other areas are not getting enough fresh water because the surface flow of water across the land has been redirected down canals.
- We’ve changed the quality of the water entering the estuaries through run-off from our yards, agricultural fields, roads, parking lots and malls, etc. Water running off the land can contain oils and other chemicals from our cars/trucks, fertilizers or pesticides from our lawns and farm areas as well as other pollutants that find their way into the streams and canals. Some of the chemicals may contain nutrients that encourage excess growth of certain plants and animals (not necessarily a good thing) while other chemicals may be detrimental to life in the estuary.
- We’ve changed when the fresh water makes it to the estuaries. We’ve built weirs, or water control structures that hold back fresh water from the estuaries at the start of the rainy season. This water can then be used for agriculture or other purposes. As the rainy season progresses the water is often released in large pulses to avoid flooding problems in areas behind the weir. The timing and amount of water released are often unnatural and can have devastating effects. The plants and animals that live in estuaries are adapted to gradual changes in salinity, but if the change is too rapid or too great, the results can be fatal for many estuarine inhabitants.

### Slide 13

How might Everglades restoration affect Rookery Bay?

- Rookery Bay is at the western edge of the Everglades.
- Everglades restoration is a 30-year, \$20 billion effort to try to correct some of the damage done to the river of grass. Historically, in south Florida, water from summer rains slowly moved across the land in what is called sheet flow. That sheet flow has been interrupted by canals, roads, etc so water isn’t delivered to the coast the way it used to be where it would slowly mix through

mangrove forests into backwater bays. Part of Everglades restoration will include filling in certain canals, removing roads and creating more culverts to allow more water to flow into natural areas that have been drastically affected through efforts to drain the land.

- Rookery Bay researchers have been conducting monitoring projects for several years – both water quality monitoring and species monitoring to evaluate the health of the Reserve. This baseline data will be invaluable as Everglades restoration takes place. Continued monitoring during restoration will allow for adaptive management practices and hopefully an improvement in health of our estuaries.

#### **Slide 14**

What characteristics indicate a “healthy” estuary?

- A healthy estuary supports not only a lot of life, but also a wide variety of life. This is an example of biodiversity.
- One of the reasons that a healthy estuary can support a large variety of life is because it is a very productive system.

#### **Slide 15**

The following 5 slides are examples of the range of biodiversity found within the Reserve Identification starts in the upper left corner and moves clockwise. Emphasize the numbers of species found in the reserve. This info is listed in the lower left corner of each slide.

Items outlined in red are “listed species”. Listed meaning they are on State or Federal Endangered species lists (may be listed as threatened, in danger of becoming endangered; or endangered, meaning they are in danger of becoming extinct. They may be on State lists of species of special concern – which means their numbers should be monitored – this is one step better off than threatened.)

- Osprey- dines on fish that it grabs with sharp talons, this smaller bird can be confused with bald eagles, with which it sometimes fights for food.
- White pelicans – winter residents from up north. Wing span can be 9 feet. This pelican fishes from the surface of the water rather than diving into water like brown pelican.
- Snowy Plover – Listed as threatened by State of Florida. Nests directly on beaches, not in nest of sticks in trees. Eggs and young are well camouflaged in sand and may be stepped on by beachgoers or eaten by unattended dogs. Plovers are one of many species of coastal birds that rely on undisturbed beaches for nesting habitat.
- Young great horned owl – not estuary dependant, but may be found in the Reserve
- Great egret – one of the species that nests on the rookery islands in Rookery Bay
- American oyster catcher – this bird uses its orange beak to jab down into the oyster shell before it can close to try to eat the oyster inside. They also eat other mollusks found around oyster beds, like crown conchs.

#### **Slide 16**

Estuarine fish

- Cownose ray – rays are occasionally caught while trawling. If encountered, you may have a chance to safely touch one.
- Polka-dot batfish – this strange fish is the unofficial mascot of Rookery Bay. Seldom seen by most people, these bottom dwelling fish are often caught in trawls.
- Small tooth sawfish – this fish was recently put on the endangered species list. They are sometimes caught by our fisheries biologist in the 10,000 islands area of the Reserve. These fish were actively hunted in the past because of the damage they could inflict on fishermen’s nets.
- Inshore lizardfish – a large mouth and sharp little teeth help this ambush predator catch food in the estuary. These fish will lay motionless on the bottom, sometimes burying themselves, in wait for their next meal.

- Hardhead catfish – one of two species of marine catfish. These fish are often caught in trawls. The males of this species are mouth brooders. They keep the eggs and young in their mouths for protection. The males don't eat while protecting the young in their mouths.

### Slide 17

Mammals (note the huge drop in biodiversity from fish, birds, and plants to mammals)

- White tail deer – not estuary dependent, but is a decent swimmer and may move between islands.
- Marsh rabbit – this rabbit is an important food source for alligators, bobcats, panthers, etc. These little rabbits can be distinguished from cotton tails because they lack the white fluffy tails, also their ears are much shorter. Marsh rabbits have webbed toes and are excellent swimmers and are well adapted to wet environments.
- Florida manatee – manatees can be seen in Henderson Creek in the Reserve more frequently during the winter. Henderson Creek has a freshwater spring that the manatees use to drink as well as to stay warmer than in the surrounding estuarine waters. Manatees are one of 2 species of marine mammals commonly seen in the estuary – what is the other? Bottlenose dolphin.
- Florida panther – panthers can sometimes be found in the reserve where they may be dining on deer, marsh rabbits, etc.

### Slide 18

Reptiles and Amphibians

- Pinewoods treefrog – a species of treefrog not estuary specific, but the reserve provides excellent habitat for its survival.
- Gopher tortoise – These generally slow-moving animals use their powerful short legs for digging burrows underground. The tunnels can run for 20-30 feet under the surface of the ground. Gopher tortoises are considered keystone species, which means their survival affects the survival of many other species. The burrows created by the tortoises serve as shelter and protection for numerous species, including other reptiles and small mammals, during cold weather or fire events.
- American crocodile – Crocs can be found in the Reserve, but are seen much less frequently than the generally freshwater loving alligator.
- Eastern diamondback rattlesnake – Venomous snakes, and snakes in general, while not loved by the public, play an important role in rodent control and are needed in the environment.

### Slide 19

Plants

- Mangroves – value, importance, legal status already discussed. Remind students of 3 types and their roles in the estuary.
- Butterfly orchid and grass pink orchid – represent both plants that are losing habitat through development. Flowering plants important for insects. Butterfly orchid – epiphytic, grows on trees, gets food from fallen leaves, etc from host plant, doesn't harm host plant. Grass pink orchid – terrestrial orchid, prefers freshwater marshy areas
- American beauty berry – represents plants that produce fruit/berries that serve as food for insects and animals (bears, raccoons and birds).
- Slash pine – grows in the higher and drier areas of the reserve, doesn't like salt water. Important for nesting birds, adapted to surviving ground fires, historical use by people – construction and sap used for making turpentine. Name comes from “slashing” the tree to collect the sap to make turp.

### Slide 20

Invasive Exotics --- All of these species represent a threat to biodiversity (the reason for concern)

What is an invasive exotic? Exotic species – meaning it comes from somewhere else, not naturally or historically found in this area. May be introduced intentionally (Brazilian pepper) or unintentionally (Asian green mussel). Invasive means that it is spreading and out-competing native species due to lack of natural controls that kept the species numbers in check in that species' native territory.

- Brazilian pepper – brought in as a decorative plant, used to be called “Florida holly”, or “Christmas holly” since it often has berries during the holiday season. This plant spreads quickly and can out-compete mangroves and other shrubs/trees. While the berries are eaten by many species of animals, the trees offer little habitat value unlike mangroves.
- Asian green mussels – a new “invader” in Florida, and Naples in particular. Established colonies discovered on rocks off Naples beach in June, 2004. This mussel is believed to have been introduced in Tampa Bay from cargo ships' ballast water. The ballast water in cargo ships can contain larval fish, crabs, shrimp, mussels, plants, etc that can spread to new territories if the water is dumped too close to shore and the growing conditions are right. These mussels have a planktonic (free floating with current) stage that allows them to spread. AGM may represent a threat to our native oyster beds.
- Australian pine – This plant is popular on beaches because it offers shade, but it smothers native plants with the dense pile of needles that accumulate underneath it. It also has a very shallow root system which allows the plant to blow over easily and accelerate beach erosion. Downed trees can be a hazard to nesting sea turtles – preventing clear beach access and presenting obstacles that could actually trap turtles attempting to nest.
- Wild hogs or boars – these animals tear up the ground and make it easier for non-native plants to spread. Wild hogs, however, can be an important food source for panthers.
- Cuban treefrogs – these frogs have several advantages over native species. They are much larger than most native tree frogs. They not only compete with native frogs for food, but because of their size and appetite, they can actually eat native frogs. Another advantage that they have is that they secrete a caustic slime that makes them less palatable than native frogs so most animals won't eat them.

What can be done? Control of exotic species is a costly and time consuming project. It is even more difficult and expensive when addressing marine or estuarine species that can spread rapidly and are more difficult to monitor than terrestrial species. Special care must be used when applying chemicals or other controlling substances that can spread in the water and cause unwanted effects on non-targeted species.

## **Slide 21**

What you can do to protect estuaries

- Conserve water - common sense issue. Short showers, fill dishwasher & laundry before running them, limit lawn watering (use of rain sensor [lower picture] required on all new sprinkler systems), don't leave water running while washing hands/brushing teeth/shaving, etc
- Limit fertilizer and pesticide use – if you aren't using these chemicals, or using them less, they will be less likely to make their way into canals, estuaries, gulf when it rains. Fertilizers can cause unwanted algal growth, may be linked to red tide events. Pesticides can kill larval invertebrates such as crabs and shrimp as well as larval fish. Remember, estuaries are nurseries so these chemicals can have devastating effects if they get in local waters.
- Landscaping with native plants – these are plants that are adapted to this environment. They may be drought tolerant (require less watering), heat tolerant, salt tolerant, and may require less fertilizer. There is less danger of native plants becoming invasive and out-competing other plants.
- Maintain septic system – again, a pollution issue. Prevent excess nutrients and harmful bacteria from entering estuary by properly maintaining septic system. Similar issues with fertilizer.
- Don't release aquarium fish or other pets into the wild – a more recent issue. “Aquarium” fish such as lionfish and panther groupers from the Indian/Pacific Oceans often get released by their owners when the fish get too big for the tank that they are in. Just like non-native (exotic) plants and animals on land, these fish don't have natural predators in our local ecosystems and they can

reproduce and out-compete native species as well as present a potential health hazard (contact with venomous spines of lionfish). Lionfish can be found from the keys up to North Carolina.

Snakes and turtles also get released and tend to do well in our subtropical environment. At best they may be a threat to biodiversity, but they can also represent a risk to our pets, kids, or even our own health and safety. Monitor lizards may be found in SW Fl. These are aggressive lizards that can grow in the 6 foot range. Boas and pythons have been spotted in the Reserve and Everglades National Park. Last year there was a documented fight between an alligator and a python in ENP.

Please think about how large the animal/fish is going to get before you buy it. Will you be able to care for it when it is larger, if the answer is no, you shouldn't buy it. Releasing exotic animals into the wild could present dangers to you or others and is illegal.

## **Slide 22**

How can I get involved at Rookery Bay?

- Volunteer!
  - Help with native plant restoration
  - Shark and fisheries research, sea turtle monitoring, red tide sampling
  - Volunteer in the Environmental Learning Center
  - Participate in local coastal clean-up efforts
- Bring your club or organization for a tour of the ELC
- Join the Friends of Rookery Bay

## **Slide 23**

Environmental Learning Center

- Opened march 2004. 2 Classrooms, 140 seat auditorium, gallery for local art
- Exhibit hall highlighting RB staff work and research
- 6 aquaria, including 2300 gallon mangrove tank
- primitive walking/nature trail
- still to come – suspension bridge over Henderson Creek, approx 2 miles of walking trails

## **Slide 24**

Enjoy the Reserve through recreation

- canoeing/kayaking encouraged in Reserve. Established/marked canoe trail – great way to explore the Reserve
- recreational boating allowed in Reserve, too
- fishing – allowed in Reserve as long as State fishing regulations are followed
- bird watching – Key Island and Rookery Islands great for bird watching/photography
- Catch the sunset from Key Island and appreciate the beauty of the Reserve

## **Slide 25**

Summary

- Quickly review what an NERR is, what activities take place there.
- Review value of estuaries
- Review importance of mangroves in SW FL estuaries
- Review how humans have affected estuaries and their “health” – how that affects us
- Review importance of biodiversity and threats to it
- Review how you can become involved with Rookery Bay.